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FOUR CLIMATIC SNAP-SHOTS IN THE UNITED STATES

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INTRODUCTION—By "climatic snap-shots" the writer would designate the impressions, necessarily very superficial, of the conditions and effects of weather and climate which a traveller who is something more than a mere sightseer may gain during a hurried railroad journey. Occasional stops for a nearer view of the country and of its people help to give more detail, and hence greater accuracy. Such impressions, even when no instrumental observations are taken, are nevertheless of considerable value in giving a vivid picture of the larger facts of climate. The recent Transcontinental Excursion of the American Geographical Society gave its members an excellent opportunity to see two climatic cross-sections of the United States. The journey being made rapidly, the climatic contrasts were sharply emphasized; the climatic snap-shots were therefore singularly clear and instructive. In the present paper, four examples out of the many which were noted are very briefly described.

THE NORTHERN CROSS SECTION: DULUTH TO SEATTLE.—Through the hardwood forests of northern Minnesota, and then among the scattering trees, the train passed quickly westward to the eastern border of the treeless Great Plains. Here, about at the eastern boundary of North Dakota, is found the mean annual isohyetal line of 20 inches—that critical limit which has been of such importance in the settlement and in the development of the Great Plains. "East of it, success; west of it, failure," is the statement which has often been made regarding the relation of this line to agriculture. Yet no fact is today of greater significance in the history of these great northern States than the extraordinary success which has been attained in agriculture well to the west of this same line by means of the scientific methods of soil preparation and of cultivation known collectively as dry farming. The famous Red River Valley, with its fertile soil, and its immense "bonanza" wheatfarms, was crossed on a beautiful Sunday morning in early September. Here the mean annual rainfall is a little over 20 inches, and the mean seasonal rainfall is less than 15 inches.

Farther west, the decreasing rainfall was clearly evidenced by the increase in the number of cattle as the farming area became more and more restricted. Wind-breaks, carefully planted and tended, showed the need of protection against the high winds which sweep over these great northern plains. Snow-fences along the railroad indicated the climatic handicap of drifting snow in the winter blizzards. Windmills gave clear proof of the necessity of pumping water. Thus the westward journey across the Great Plains gave a vivid picture of the importance of the rainfall control. At Bismarck, North Dakota, some irrigation was noticed, but not yet on a large scale. Dry farming has been so successful throughout an extended area in the West in the recent years of heavy precipitation that the need of irrigation in the long run has not yet been realized by hundreds of farmers who have prospered without it. At Medora, in the "Bad Lands" of western North Dakota, the trees were seen to be closely limited to the valley bottoms, as was also noted a good deal farther east, and the aridity was indicated by the presence of the sage-brush and of scattering cactus. Beautifully green and fertile are the river valleys through which the Northern Pacific Railroad crosses Montana and northern Idaho, with their crops of cereals, and alfalfa, and vegetables, and fruit, and with their farm-houses nestling down among the trees. But back of these oases there are the sage-brush and the bunch-grass and the aridity of the semi-desert, with their scattered cattle and sheep, while many dry farmers are trying their luck on the debatable ground between the valleys and the "desert."

In the sub-arid region of eastern Washington, on the fertile soil of the decomposed lavas, Spokane, with a mean annual rainfall of about 18 inches, and a rainfall in April, May and June of less than 5 inches, is the centre of a district of wonderful agricultural prosperity. From Almira, somewhat west of Spokane, an excursion was made by motors through a dry farming district where remarkable success has recently been attained with wheat in a region with considerably under 20 inches of rainfall a year. There is no water available for irrigation over these wheat fields. It must be dry farming, or cattle.

But there is a limit, even to dry farming. The journey southward on the lava plateau of Washington, across the Columbia River at Pasco, and then westward and northwestward up the valley of the Yakima River, brought the train into a district, in the lee of the Cascade Mountains, where the annual means of rainfall vary between 7 and 18 inches, according to topography and elevation. It is here that man has turned the sage-brush desert into one continuous garden. Here the wonderful orchards of apple and peach and pear trees, reaching for miles and miles in every direction, make the traveller realize that the glowing accounts which have been printed of this region are not so greatly exaggerated, after

all. Up on the summits and upper slopes of the Cascades there is a rainfall ten or fifteen times as great as that in the valleys at the eastern base—a rainfall resulting from the presence of the mountains in the path of the rain-bringing westerly winds. It is this water which has been collected for the use of man in the Yakima irrigation projects. When completed, these projects are designed to supply water for 500,000 acres. Irrigation is but an expression of man's dissatisfaction with the amount, or distribution, of the local rainfall. At North Yakima man has expressed his dissatisfaction most emphatically by planning these great irrigation works, which have revolutionized the whole settlement and use of that particular section. The interest of the climatologist in this Yakima country is not so much in the number of car-loads of fruit which are sent out daily, or in the value of the land, or in the size of the apples, pears and peaches. His interest is rather in the relation of the dry, leeward, "rain-shadow" valleys to the well-watered mountain summits. By reason of their altitude and location, these mountain summits receive the heavy precipitation which largely makes up for the deficiency of rainfall in some of the lower valleys to leeward. There is here an interesting example of the compensation which is sometimes seen so clearly in climatology.

From North Yakima, past the orchards and fertile fields of Ellensburg, and then across the mountains, the journey gave clear views of the treelessness of the lower lands on the east, except where wind-breaks and orchards have been planted under irrigation; of the interesting overlapping of the forests from the rainy western slopes into the higher portions of the eastern valleys, and then of the densely forested western slopes, down which the train descended on its way to Seattle.

Crossing the Sierra Nevada Mountains.—Early on the morning of September 22 the special train of the American Geographical Society began to ascend the western slopes of the Sierra Nevada Mountains on the eastward journey from San Francisco to Salt Lake City. The vineyards, and the orchards, and the orange groves; and then the forests-too often recklessly cut away—of the higher slopes, bore witness to the fact of a sufficient and well-distributed water-supply. We need no meteorological tables to assure us that these mountains are admirably situated to give us an example of the increase of rainfall with altitude. If we desire the numerical proof, we have it in the records of mean annual rainfall between Sacramento and Summit. Between these two stations there is an increase of rainfall of about 0.4 inch for every 36 meters of elevation. The rate of increase is greatest at about 1000 meters, and becomes negative above 2000 meters. The mean annual rainfall at Sacramento is 19.40 inches; at Summit (7017 feet) it is 48.07 inches. The higher elevations have very heavy snowfall. At Summit the average depth of snow is 36 feet (433 inches.) Twice in 33 years the amount has reached 63 feet (775 inches).

This heavy snowfall has necessitated the construction of about 40 miles of snowsheds over the tracks of the Southern Pacific Railroad, and to the establishment of an elaborate system of watchmen and of fire trains to keep these sheds from being destroyed by fire. The snowsheds, and these precautions against fire, as well as the snow-plows, involve a heavy expense on the part of the railroad—a splendid illustration of a climatic control over railroad operation. Travelling through these many miles of snowsheds is far from agreeable. The view is greatly obstructed, and the smoke from the oil-burning locomotives makes the air unpleasant to breathe. Yet these very discomforts only serve to emphasize the climatic lesson which the sheds teach—the lesson of heavy snowfall, on the upper slopes of a high mountain range, near the ocean, in the path of the prevailing westerly winds.

From the crest of the Sierre Nevada the descent into Nevada is rapid. Similarly, the change in rainfall is rapid. The traveller cannot fail to notice that the snowsheds extend a much shorter distance east of the crest of the mountains than to the west (windward). He therefore infers at once that the amount of snowfall decreases rapidly on the eastern (leeward) side of the summits. The green slopes and forests of the west are replaced by the sage-brush and allied forms of vegetation on the east. From a rainfall of 50 inches at Summit we descend, with startling suddenness, into the Nevada desert, with its alkali flats, its dust, and its less than 5 inches of rainfall.

Arizona: Its Mountains and Its Water Supply.—A visit to Phoenix, Arizona, and an excursion to the Roosevelt Dam, emphasized some important facts in Arizona climatology. It is well known that southwestern Arizona is extremely arid. Yuma, for example, has an average annual rainfall of only slightly over 3 inches. Under these conditions there is obviously far too little water for agriculture in any form whatever without irrigation. But Arizona is fortunate in having its mountains and its plateaus: it is not all as near sea-level as is its southwestern corner. And over these mountains and plateaus falls the rain and the snow which are of such vital importance in irrigation. If Arizona were all lowland it would be a very hopelessly dry region. The rainfall there varies almost directly with the altitude. From a mean of less than 5 inches in the southwest, the amounts increase to about 8 inches at 1000-2000 feet; to about 12 inches at 2000-4000 feet; to over 14 inches at 4000-6000 feet; and to 16 to 20 inches at altitudes of over 6000 feet. It is, thus, over the higher country of Arizona that we find the so-called 'islands," or rather "lakes,..." of heavier rainfall seen on the detailed rainfall maps. From these "lakes" flow the rivers which, when dammed, as in the case of the Salt River by the Roosevelt Dam, supply water enough to irrigate thousands of acres.

The trip from Phoenix, in the Salt River valley, up into the moun-

tains to the Roosevelt Dam, was made on October 4. While two rather heavy showers were encountered before the lower, level country was left behind, it was clear from observation of the clouds that the mountains were receiving far more rainfall than the valley. At the Dam, twenty-four hours of heavy rain prevented the party from returning to Phoenix until a day later than had been planned, the journey back being too dangerous, if not impossible, for motors. This long, dreary day at the Roosevelt Dam taught an important climatic lesson. It emphasized, most strikingly, the value of Arizona's mountains in supplying the water which the state so greatly needs. The value of this one spell of rainy weather to the farmers and fruit-growers of the Salt River Valley was surely to be reckoned in thousands of dollars. Phoenix receives, on the average, less than 8 inches of rainfall annually. Over the watershed behind the Roosevelt Dam about 12 inches fall. These four inches seem relatively insignificant. But it is just these four inches, resulting from the difference of altitude, which, when carefully collected, and stored, and wisely distributed, make the glory of the Salt River Valley, of which Arizona is so justly proud.

THE RAINY DESERT.—For a week, from September 30, the Excursion Party was in the "deserts" of New Mexico and Arizona. Rain fell on five of these days. At Santa Fe, on the afternoon of September 30, there was a shower between 3 and 4 P. M. On the afternoon of October 1, while an excursion was being made to Crater Butte, there was a wonderful development of cumulo-nimbus clouds which resulted in many showers of short duration—those fitful, uncertain showers which are so characteristic of the more arid portions of our country. October 2, at the Grand Canyon, brought a heavy thunderstorm between 7 and 8 A. M. On October 3, also at the Grand Canyon, a thunderstorm occurred in the evening. On October 4, during the motor ride to the Roosevelt Dam, showers interfered with the outdoor luncheon generously provided by the citizens of Phoenix. The heavy rains of October 5 have already been referred to in the preceding section. All these rains came as a surprise to the party. Being in a "desert" region, no rain was expected. In fact, these New Mexico and Arizona rains were almost the only rains which were met with in the long trip of eight weeks. They were, therefore, of double interest.

Taken in the large, there are two rainy seasons over this New Mexico and Arizona country. One of these—the most marked—comes in July and August, extending in places into early September. These rains are essentially local, mountain, or convectional rains. The other rainy season, which is less marked, comes in the colder months and results from the passage of the usual cyclonic storms of the winter. An examination of the daily weather maps shows that the showers of September 30 and of October 1 were local, and not part of any general cyclonic disturbance. On October 2 there was a considerable area of unsettled weather in the far

southwest, but no general rains. The thunderstorm of October 3 was, again, purely local. On October 4 a trough of low pressure extended from north of North Dakota southwest to the Pacific coast, with a good deal of cloudiness and scattered thunderstorms. In the 24 hours ending at 8 A. M. October 5, Santa Fe received .56 inches, Flagstaff, 1.78 inches, Yuma, .04 inches, and Phoenix, .14 inches. The all-day rain at the Roosevelt Dam on October 5 was part of a general storm which had developed from the unsettled conditions of October 4, and at 8 A. M. covered the Plains States, and the central Rocky Mountain and Plateau regions, accompanied by widespread rains and snows. The disturbance was central over Utah and Colorado. During the 24 hours ending at 8 A. M. October 6, Santa Fe had received .04 inches; Flagstaff, .34 inches, and Phoenix .06 inches. The rainfall at the Roosevelt Dam, not reported on the weather map, was much heavier than that at Phoenix. Thus the rains which were experienced in New Mexico and Arizona afforded an excellent illustration, as we might say, of the precipitation-conditions of the two rainy seasons in this "desert" region: the local showers of summer, and the general rains of the colder months. The Excursion Party of the American Geographical Society was singularly fortunate in having this interesting experience in the rainy desert.

THE VALLEY PEOPLE OF EASTERN BOLIVIA

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IT was with the keenest delight that I looked for the first time upon the tropical forest that mantles the eastern slopes of the Bolivian Andes and the bordering tropical plains. We had traveled for weeks upon the great *alti-plano,* or high plateau, of Bolivia and northeastern Chile,—traversed its mountain valleys during the cold winter season, ridden through a wilderness of snow in the great Cordillera de Sillilica and after a short stop at vernal Cochabamba made for the tropical plains of the Chaparè valley in eastern Bolivia. There we exchanged riotous vegetation for xerophilous shrubs, abundant rains for the desert climate of plateau Bolivia, and tropical heat for the dull, lifeless, inexorable cold of "the roof of the western world."

The change from the bleak, dry, lofty plateau to the jungle is startlingly sudden. At Cuchicanchi, twenty miles northeast of Cochabamba, we crossed the Abra de Malaga at 13,000 feet. Flecks and patches of snow lay in the protected corners of the mountains. A cold raw wind blew, almost a hurricane, through the pass. Behind us at 12,000 feet and lower, were the thick-walled huts of the plateau Indians, the well-cultivated but meager patches

of potatoes and barley, the wandering flocks of llamas and sheep. Before us lay the mysterious secluded valleys of the eastern Andes. In three hours we rode down from winter and aridity to eternal spring and an indescribable exuberance of vegetation. That night the pass and the adjacent mountains were covered with snow which shone out brilliantly white at sunrise in contrast to the sombre green of the forested slopes upon which we camped. Instead of thick-walled huts one sees here huts with no walls at all. Heat and moisture require not walls but roofs; cold and aridity, not an elaborate roof but thick walls. Birds in certain numbers, flowers and odors almost forgotten, and bush-bordered and irregular forest trails down precipitous valleys brought back again that romance of travel which the plateau in midwinter had all but driven away. Each valley into which we looked was a "Val-paraiso"; each forested slope revealed a thousand delights of curling mists, tumbling mountain brooks, and delicate, fascinating greenery.

Here one stands indeed upon the common borderland of two worlds. Climatic and ethnic boundaries are equally well marked by the mountain divide that separates plateau from eastern valleys and plains. The ways of life, the architecture, the habits and customs of the people of these eastern valleys are as unlike those of the plateau as they are unlike those of Scandinavia. The forest with its heat and moisture is and has always been as impossible to the llama as it has been dreaded by his master, the upland Indian, who thrives in greatest number where his chief domesticated animal lives. Time and again the Inca Indian kings sent their well-drilled, well-equipped armies to conquer the Indians of the plains. Fortresses were built and military campaigns conducted, but defeat was as universal as it was dismal. The plains were in themselves the greatest foe to the eastward extension of the Inca Empire. The armies from Cuzco could easily have overcome the untrained men of the forest if contact had been assured. But the forest dwellers slipped through the secret ways of the pathless jungle and allowed their powerful allies—disease, heat and insects—to fight their battles for them. It was easier to extend the boundaries of the empire, as they were indeed extended, a thousand miles into arid Chile, than a hundred miles into tropical Bolivia. The cost of military operations upon the plains was relearned in an appalling way during the Revolution of Acre in 1900, when General Pando and his army, after the most distressing hardships, reached the scene of the disturbance and eliminated the "Republic of Acre," that new South American republic destined to have an existence as romantic as it was brief.

In traveling through the western Andes one is somewhat disappointed at the safe trails and rather easy grades which on the whole he finds there. But he need only ride down, or one would better say, slide and tumble down one of the trails of the eastern Andes to have his taste for adventure

fully gratified. The frequent rains and their attendant washouts combine with the precipitous valley and mountain slopes to render the way at times all but impossible. For a part of the year, indeed, the Inca Corral trail to Santa Rosa at the head of navigation on the Chapare is closed. The natural difficulty of the trail is increased by the venturesome mule that persists in its traditional habit of trying one's nerve by pausing on the brink of a two thousand foot precipice, "to sound the rescent," as the natives say, at the same time resenting in a thoroughly disquieting way any attempts at control.

However hot and trying the lower Amazon plains may be the intermediate slopes of the eastern Andes are almost Arcadian in climate and scenic beauty. Certain pictures of these forested valleys are among the most enduring and delightful of the memory. The economic development of the region waits, to be sure, upon the improvement of transportation facilities. One cannot regard the conditions of life as perfect in a region where Indians carry rough-hewn cedar planks a week's journey for making furniture; or where malarial inhabitants at lower elevations carry cinchona bark and coca leaves on their backs over the same trail and yet are too poor to buy the quinine necessary to stamp out their most dreadful disease. Some better means of communication must be secured before even a moderate development of the resources can be made. Only the more precious of the substances produced here will stand the great tax imposed by the long carriage necessary to place it within reach of the railroads and the world's markets. Rubber, hides, and chocolate are now taken through the valleys on their way from the llanos of the lower Mamore and Chapare valleys, an arduous journey of a month by canoe and two weeks by mule caravan to the railroad at Oruro. In the valleys themselves only the cedar wood, the cinchona bark, coca leaves, bananas, oranges, and several varieties of other fruits and also peppers are produced for export. The wearisome task of conveying these on the backs of the Indians over the steep mountain trails excites not only the wonder but the pity of every observer. It is a heart-breaking task that only the urgency of their needs can explain.

The lines of communication are wholly from valley to plateau and not from valley to valley. This is owing, not to greater difficulty of transport in this direction for no transverse trails are quite so difficult as those now followed to the very headwaters of the great river systems of the eastern Andes. It is due, rather, to the complementary nature of the products of plateau and valley. The cedar, cinchona, coca, and fruits of one valley are produced equally well in a neighboring one or with such slight difference that the high cost of transportation on these bulky substances does not enable them to be carried except to the plateau where they are entirely wanting. The shops and markets of Cochabamba, Oruro, Sacaya, La Paz,

Huynuni and a score of other plateau towns are thus kept supplied the year round with a line of goods so complete and so exotic as to excite wonder in every observer. It is difficult to realize at what labor these products of the warm eastern valleys have been brought over the long, hard trails to the consuming centers on the plateau.

The lack of wood upon the plateau finds interesting expression in the disproportionate difference in cost between articles made from it and from material locally supplied. The price one old Aymara farmer asked for an oxwhip seemed to be quite beyond reason. When I remonstrated he stripped off the intricately braided lash and offered it for a trifle—the very part I prized most and supposed to be most valuable. His explanation was that cattle and therefore hides for lashes were in relative abundance on the plateau but the wood for the stock was very precious—a rare hardwood that had been brought by a relative almost a month's journey toward Santa Cruz de la Sierra.

It is easy to see that the conditions of life have only to be a little harder with reference to the materials of commerce and only a little easier with reference to food and climate to force barbaric or savage ways upon the native inhabitant. Hence at lower elevations, at the edge of the *tierra caliente* or hot country, one finds the first sprinklings of the true plains Indian, the painted savage, clothed in bark, and indifferently hunting forest and stream for food to supplement the yuca, his otherwise monotonous diet. The tranquility of the valley life is broken by the hard conditions of transport; so too the plains dweller has his difficulties, but these are rather the difficulties of malaria, and other tropical diseases, of too-frequent rains, a veritable scourge of insects, or an overburdening vegetable world to which he yields as one subdued by the environment in which he lives. It is a far cry from the life of the savage in the Amazonian forest to that of the highland dweller though a week's journey only is required to go from the steaming tropical lowlands of the one to the bleak plateau of the other.

Upon the rivers of eastern Bolivia are borne some of the most precious of that country's products. Rubber and chocolate are taken upstream to the plateau towns, Cochabamba, Oruro and La Paz. And every downstream canoe and batelon is loaded with merchandise for the people of the plains towns; Trinidad, Villa Bella, etc. One of the most important of the downstream products is salt for the dampness of the plains climate prevents the accumulation of salt deposits while on the desert plateau every briny lake is bordered by a fringe of salt so abundant as to be had for the asking. On the plains it brings a high price, as much as thirty cents a pound and in some places it is unobtainable. It is required not only for the people of the plains but also for their cattle and for the curing of the hides that are shipped out of the country.

Once these plains were a great inland sea but the steady work of the streams has filled them up and only isolated lakes now mark the site of a former extensive sheet of water. The alluvium of the rivers is of the finest sort and stones and rock are unknown over wide areas. The Indians must therefore depend upon wood and bone for their weapons and domestic implements. Their arrows are made of long straight reeds tipped with barbed points of hardwood and feathered with the feathers of wild duck and parrots. They shoot with wonderful proficiency and seldom fail to secure the object of their aim at the first try. Fish are obtained not with hook and line but with bow and arrow. These and dried roasted yuca with some raw sugar cane added, and once in a while a monkey are the chief articles of food.

From the tops of projecting spurs on the eastern border region of the Central Andes one may look out over one of the most fascinating scenes that South America affords. Before one stretch almost illimitable plains covered with a forest whose waving tree tops are bent down the strong and constant trade winds that blow from the southeast. One walks in the tropical forest always in a kind of gloaming. There is a fascination in its vast trackless spaces. Only a few huts at long intervals on the river banks and now and then one a little more secluded set into the jungle. Back from the river's edge men know but little of the tangled forests. To the Indians they are the home of the wild beasts they hunt for food and of the evil spirits that lurk in wait for the unwary. One may appreciate the beauty of the dense tropical jungle, for it has a certain wild beauty all its own, and nevertheless come out of its dark shadows with a feeling of distinct relief, to the tiny settlement with its open sky and river vista.

Almost in the shadow of the snow-flecked mountains I once embarked in a dugout canoe manned by four native canoemen for a short river journey. After shooting the inconsequent rapids below Santa Rosa, the head of navigation, we were swept smoothly along by the rapid current and the excited efforts of our men, until nightfall, when we encamped on a sand-bar where there was abundant and dry fuel in the form of drift wood and excellent and comfortable camp sites in the soft sand. As soon as camp was made the Indians gathered drift wood and built a huge fire which served the double purpose of cooking our food and of keeping away the hordes of mosquitoes that start nightly from the shade of the jungle. We were protected by our tent and a "mosquitero," but the poor Indians fared worse than we. As their fire died down and the smoke abated the mosquitoes fell upon them and by morning arms and legs were a pitable sight. The bark shirt worn by these men affords almost no protection. Its open weave is well adapted to the heat of the day but one might as well be naked for the protection it affords at night from the countless and voracious swarms of insects.

The plague of insects in the tropics is generally not regarded as a

serious matter by the people of the cool zones. Much more importance is attached to the high temperatures and the so-called tropical diseases. Yet the insects must be counted as a positive factor because they not only carry disease in some cases but also so torment and weaken the system as to make it easier for the germs of disease to thrive. Hand in hand with the efforts that are being made in a few tropical countries to cure disease must go preventive measures such as the draining of mosquito-breeding marshes and the screening of porches from insects in general, for, in many cases, far greater pests than the mosquitos are the tiny flies that crawl into the bedding at night and infest the air by day, leaving red itching sores wherever they bite.

The vast low-lying Amazon basin with its great swamps, bordering lagoons, and network of rivers threading thousands of square miles but a few hundred feet above sea level is especially favorable to the fostering of hosts of insects. So thinly scattered are the people, and so ignorant are they, that the extermination of the insects is still impossible. The most that the few white men have done is to provide shelter for themselves at night and to locate their homes where air drainage from the forest paths or from the hills nearby prevents the unlimited accumulation of insect swarms. The time is very far distant when men in large numbers will make their homes in so troublesome a region despite the enthusiastic prophesies of men seated in comfortable offices in the temperate zones.

THE WORLD'S GREAT RIVERS—THE PARANA

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THERE are three main gateways to the interior of South America, the Orinoco, Amazon and Parana rivers and their valleys. Between these gates, the margin of the continent is bordered by high mountains or steep plateau escarpments, which, for the most part, are surmounted only with difficulty. The Orinoco and Amazon gateway lead through and into the heavily forested, hot, and rainy sections of equatorial America. The Parana, with its estuary the Rio de La Plata, leads through and to vast open grass lands lying in the best of the temperate and sub-tropical lands of South Amerisa (Fig 1.). This combination of favorable conditions has made the Parana gateway the most important artery of commerce on the continent.

The lower part of this drainage system, the Rio de La Plata, is not a river, but a great estuary, extending (195 miles) northwest and southeast;

widest (135 miles) where it joins the ocean, narrowest (about 35 miles) near its head. It may be compared with Chesapeake Bay, except that the latter is much narrower. The name, "La Plata" (silver), is supposed to have referred to the silvery appearance of the water as the explorers first saw it; but the present mud-laden waters, at times, discoloring the ocean for 100 miles off-shore, suggest anything but silver. Over most of its area, the estuary is relatively shallow, and is steadily becoming shallower through deposits of fine silt. This shallowing necessitates constant and expensive dredging operations at the ports along its shores. Even now the largest vessels (drawing over 27 feet) can not enter the port of Buenos Aires, though the deepening of the channel to admit vessels of 30 foot draft is well under way.

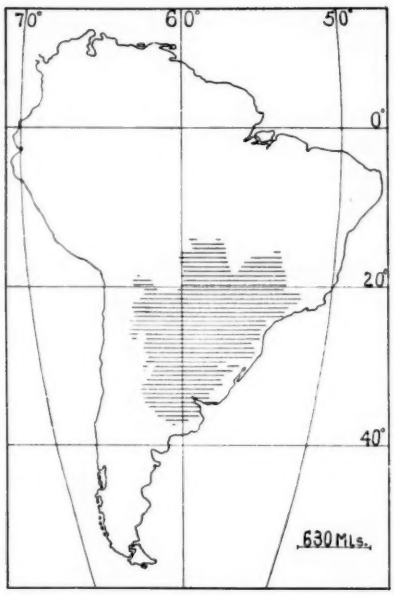

Fig. 1:—Sketch map of South America, showing approximate extent (cross-lined area) of Parana basin and its relation to the continent.

At the head of the estuary, the rivers entering it have built, and are rapidly extending, a large delta. Much of the land drained by the Parana has been formed by similar deposition in an estuary, the ancestor of, but much greater than, the present one. A half-dozen or more distributaries, leading maze-like through the delta, cut it into a number of "islands." These islands are mainly low and wet, and are covered with a heavy growth of trees and underbrush. But from some parts, drained and cleared, fine vegetables and fruits are taken to the Buenos Aires market. If not checked artificially, the growth of the delta along the western shore of the estuary would, in a few centuries, shut off Buenos Aires from the ocean.

On the eastern side of the delta (Fig. 2) is the broad mouth of the Rio Uruguay, marking the boundary between Argentina and little Uruguay.

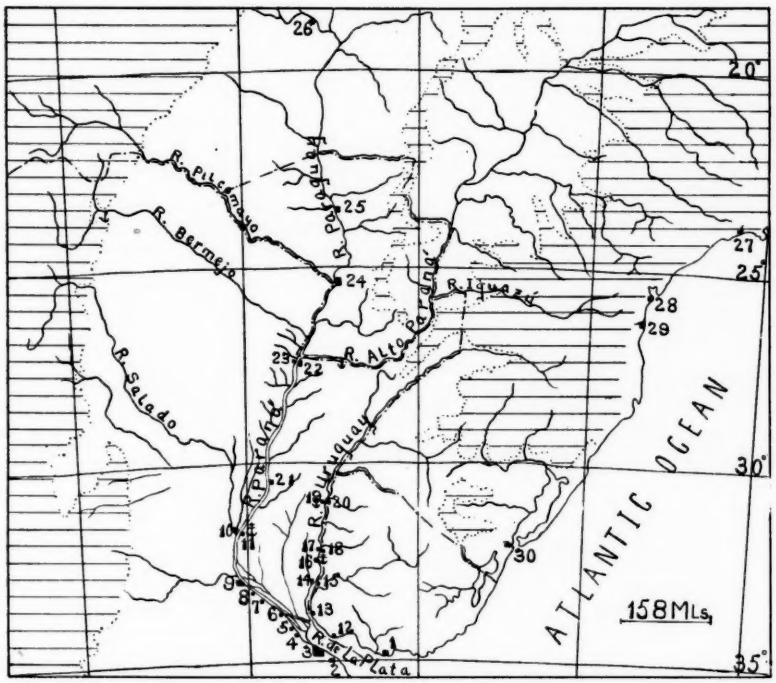

Fig. 2: Map showing main part of Parana system and its basin.
Cross lined area shows regions lying above 1000 feet.
International boundaries shown thus — - —.
Numbers indicate positions of river ports, and ports on the Atlantic Coast which may serve as commercial outlets for the Parana basin.

1. Montevideo	11. Parana	21. La Paz
2. La Plata	12. Coloma	22. Corrientes
3. Buenos Aires	13. Nueva Palmyra	23. Barranqueras
4. Campana	14. Gualeguaychu	24. Asuncion
5. Zarate	15. Fray Bentos	25. Villa Concepcion
6. San Pedro	16. Concepcion del Uruguay	26. Corumba
7. San Nicolas	17. Colon	27. Santos
8. Villa Constitution	18. Caysandu	28. Parangua
9. Rosario	19. Concordia	29. Sao Francisco
10. Santa Fe	20. Salto	30. Rio Grande de Sul

At its mouth, the river is five miles wide, while higher up it spreads out to nine miles in some places, and does not fall below one mile in width for a distance of over 200 miles. This broad channel offers easy navigation for ocean-going vessels to Colon (17, Fig. 2) and Paysandu (18, Fig. 2), over 300 miles from the ocean. River boats ascend to Concordia (19, Fig. 2) and Salto (20, Fig. 2), where navigation is interrupted by the falls (-salto).

This section of the Rio Uruguay serves as the commercial outlet for much of Uruguay, and for a large part of the Argentine provinces lying between the rivers (the so-called Argentine Mesopotamia). Some of the most famous meat centers of the world lie along this stream, as Fray Bentos (15, Fig. 20), the home of the Liebig Company, and Paysandu with its great canneries of ox tongues. The making of jerked (dried) beef, beef extract and tallow are developed largely at several other places.

Along the western side of the delta, a rather difficult passage through one of the many mouths, leads into the main Parana near San Pedro (6, Fig. 2). For more than 500 miles above the delta a volume of water rivaling, and, at times, much exceeding that of the Mississippi, pours along in a great stream which in few places is less than two miles wide, and for long stretches resembles a lake more than it does a river. Vessels of deep draft (26 feet) go by scores to Rosario (9, Fig. 2), 400 miles from the ocean, while vessels of shallower draft (20 feet) go to Santa Fe (10, Fig. 2), more than 100 miles higher. River craft ply for hundreds of miles beyond this place. Four lines give regular service between Buenos Aires and Corrientes (750 miles; 22, Fig. 2), with a total of six steamers each week. Two lines maintain a weekly or semi-weekly service to Asuncion (950 miles; 24, Fig. 2) with fortnightly service to Corumba, (26, Fig. 2), more than 1,300 miles from the ocean. Some of these river boats offer excellent accommodations in every way. Smaller craft than the regular river steamers ascend 300 miles beyond Corumba, to Cuyaba, almost in the heart of Brazil.

In the Parana, as in the Uruguay, the width of the river and the relatively straight channel make it possible for vessels to maintain higher speed than is practicable in narrow rivers, where there is danger of running aground, and where the waves from the wake might cause serious washing of the banks.

Besides this navigable main stream, extending north and south, there are the great tributaries from east and west, draining from such remotely separately regions as the coffee lands of Sao Paulo, Brazil, and the famous silver region of Potosi, Bolivia. Some of the smaller headwaters of the Paranahyba rise within 100 miles of Rio de Janeiro, while the source of the Pilcomayo is within 300 miles of the Pacific Ocean. Many hundreds of miles of navigable waters are found in the tributaries of the Parana. Both in the east and in the west these tributaries and their valleys have been natural lines of travel during the whole period of South American history. The Salado helped locate the old trail from Potosi to the Atlantic, and the Alto Parana led the mission fathers from Brazil to Paraguay and the Argentine territory, Misiones, which commemorates their name. Now these streams, aside from the routes provided by their navigable reaches, help communication by offering good routes for railroads. The railway running westward from Paranagua (28, Fig. 2) to Ascuncion, for example, is follow-

ing the Iguazu. This railroad will pass close to the famous falls which rival Niagara in size and grandeur.

A dozen rivers of the world are longer than the Parana, even when the latter is measured to the source of its most remote tributary, but few rivers offer as good natural conditions for navigation for such long distances. Only three or four exceed the Parana in size of area drained.

Most of the area drained to the Rio de La Plata (more than 1,200,000 square miles) is level and relatively low land, so level in fact, that over many thousands of square miles not a hill nor a hollow can be seen. These extensive plains are made of deep accumulations of fine water-borne materials, probably deposited in a great estuary, in much the same way as the Parana delta is being extended at present. East and west from the main stream the surface rises gradually, but so slowly that the drainage area as a whole lies below 1000 feet (Fig 2). Through the deep, fine soils of these gently sloping plains the main stream, and its western tributaries, especially, follow well graded courses, on low gradients, for many hundreds of miles. Thus the river at Corrientes, nearly 900 miles from the sea, is less than 150 feet above sea level. But, unlike many streams flowing on such low slopes, the Parana has developed no marked meanders. Only the eastern tributaries are interrupted by falls, as they come down from the harder and older rocks of the southern Brazilian highlands to the soft deposits in the plains. Over much of the plains the surface is but poorly drained, and on many Spanish editions of maps the words, "banado" and "estero" (swamps and marshes) appear frequently. One Argentine province, Santiago del Estero, owes its name to one of these features. Some of these poorly drained places are extensive, as Laguna Ibera, southeast of Corrientes (22, Fig. 2), which half lake, half marsh, covers an area more than 100 miles long and nearly a score of miles wide.

Along parts of the lower Parana, and especially along the Paraguay, the river banks are so low that vast areas are flooded periodically, and when the floods come, man, and all his works, are quite helpless before them. Not infrequently it takes months for the water to drain off. The worst floods in the lower valley are due to the combination of flood waters from the Paraguay and the Alto Parana, which may occur in May and June. Persistent, strong, southeast winds also help, at times, by backing up the water in the estuary. When such a combination does occur, much damage results and means of communication may be seriously interrupted in the river provinces. Thus the Argentine railway guide for August, 1912, under the heading for some lines lying near the lower Parana, stated, "Service suspended until further notice on account of inundations." The floods referred to began in May. Insecure foundations for bridge piers, floods, and other factors, prevent the bridging of the Parana, and force the whole

Mesopotamian region to depend on ferries or river routes for contact with the outside world.

The great lowland of the Parana basin is not a unit climatically. The tropical lands at the headwaters of the Paraguay differ sharply from the mild temperate region about the estuary. Toward the western margin of the basin the rainfall is low, while on the eastern border it is quite uniformly abundant. Over most of the region, however, the climate is favorable to great productivity from the deep, rich soil. An almost endless variety of products can be obtained from the sections near the main navigable streams, to say nothing of the outlying portions. From the wheat, corn, and other cereal regions of the lower Parana one passes through the subtropical fruit belt,—where 1,000 oranges may be bought on a tree for a dollar or even less,—through the sugar cane and cotton lands, the natural rice fields, the mate regions of Paraguay and Brazil, into the region so close to the equator that all tropical products can be raised. Vast areas still forested, with many types of trees, chief of which in present importance are the quebracho of the west and the pine of the east, and almost unbounded grassy plains for cattle grazing, are found along with the rich farming lands. In ability to produce valuable commodities from the soil, the Parana drainage basin is one of the most favored parts of the earth. In the development of the country the navigability of the river has been a leading factor.

In the year 1910, an average year, the leading 18 ports in the Argentine Republic carried on over 98 per cent of the total foreign commerce of the country. Fifteen of these ports (exceptions were Bahia Blanca, 3rd.; South Georgia, 12th.; and Mendoza, 16th) are between the mouth of the estuary and the confluence of the Alto Parana and the Paraguay at Corrientes. Two, La Plata and Buenos Aires, are on the estuary (2 and 3, Fig. 2), five are on the Uruguay river side of the delta, and the remaining eight lie along the main Parana. Nearly 95 per cent of all Argentine commerce passed through these 15 ports. Almost all Uruguayan water-borne commerce passes through the six ports from Montevideo, on the estuary, (1, Fig. 2), to Salto, at the head of navigation on the Uruguay river. Paraguay has no water outlet except by the river, and, in fact, for commercial purposes, the river is the only effective communication with the outside world. The commerce of these three countries, therefore, depends almost entirely on this gateway to the continent. The combined commerce of the three is equal to more than one-third of the entire commerce of South America.

Buenos Aires, the second port on the American continents, and eighth in the world, has developed beside the estuary. Twenty-eight separate steamship lines offer regular passenger and freight service at least once a month from this port. These regular sailings, together with the tramp steamers and sailing vessels, make Buenos Aires one of the busiest ports in the world. Rosario, as great a port as Rio de Janeiro and greater than San

Francisco or the Puget Sound ports, owes its rise to the wonderful cereal and cattle lands back of it, and in front, the deep water of the river over 400 miles from the ocean. Only ten ports in the two American continents surpass Rosario in value of commerce carried on. At Rosario, Santa Fe, and even smaller ports than the latter, modern dock facilities of the most approved type may be seen. The Rosario docks, for example, have 40 giant electric cranes, besides many smaller ones, which help to handle cargoes between vessels, warehouses, and freight cars. Such dock facilities as are found at these river cities would put to shame some ocean ports of much greater size in this country.

Corn, wheat, hides, cattle, wool, meat and lumber (especially quebracho, for the tanning extract) are the chief commodities shipped out from these ports. More corn is shipped from Parana river ports than from all the ports of the United States. The bulk of exports goes to European countries, excepting the hides, wool and quebracho, which comes in fairly large amounts to the United States. Both tramp steamers and regular lines of freighters ply to and from these ports, even as far up as Santa Fe. Manufactured goods of all sorts from Europe and the United States make up the bulk of imports.

Great as has been the development of this region in late years, the possibilities of the Parana basin are as yet scarcely touched. Cattle are grazing on land which can grow corn, sugar cane or cotton, while sheep roam over many acres which ought to be planted to wheat. The great areas of northern Argentina are being linked with the Parana route by new government railroads and by the artificial deepening (also by the government) of the tributary Rio Bermejo, now already done for over 600 miles. These transportation facilities will open millions of acres of good farming land, natural pastures and valuable forests. Paraguay, eastern Bolivia, and much of the state of Matto Grosso, Brazil, are still largely undeveloped. All have vast latent possibilities. It is argued by some that these areas will be developed not from the river route, but by railroads running east to some such Brazilian port at Paranagua. Such railroads are now being constructed, but from the mouth of the Rio de La Plata to Rio de Janeiro, the Atlantic coast offers only two logical outlets for the railroads in a distance of more than 1,200 miles. These places are Paranagua (and Sao Francisco, 28, 29, Fig 2) and Santos (27, Fig. 2). It does not seem likely that such outlets, reached only after a long uphill journey over the Brazilian highland, can meet the commercial needs incidental to the development of the great plains of the Parana basin.

River traffic, however, to the great ports near the estuary, can be developed without limit, and, with the river supplemented by longitudinal and transversal railways, unlimited commercial needs may be taken care of by the Parana gateway. Hence, this Parana route seems destined to con-

tinue to have passing in and out one of the greatest of the streams of world commerce.

THE COURSE OF STUDY IN GEOGRAPHY

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BETTER RESULTS IN GEOGRAPHY

THE expenditure of time and effort in any study should bring returns. Too often, however, the results in geography are not commensurate with the time and effort expended. While the subject should be one of the most interesting, the study is often uninteresting and formal, and the recitation perfunctory. If the situation be carefully analyzed the following conclusion will be reached: Satisfactory results are contingent upon (a) better prepared teachers and (b) a better method of presentation.

It requires a wide range in scholarship to teach geography well. Think of the science involved in the explanations of change of seasons, planetary winds, tides, cyclonic storms, and volcanoes; consider the ideas involved in explaining influence of water bodies upon climate, the formation of soils, the sculpturing of the earth's surface, the influence of geography upon history, etc. The great obstacle that impairs the results is the meagre preparation of teachers to handle the subject. The second reason why results are unsatisfactory is that the general method of presentation is essentially wrong.

COURSES OF STUDY AND TEXTS ARE FOR THE TEACHERS, NOT VICE VERSA

Teachers, and superintendents also, often overestimate text books and outlines of study. The teacher must *use* the course of study, must vitalize the text-book. Books and outlines, however good, do not constitute a panacea; they are helps and tools that contribute toward securing desired results. A few months ago a committee of Wisconsin teachers outlined a course of study in geography. The work was rather hurriedly done and does not represent the best efforts of those who composed the committee. It is quite true, however, that as good results can be attained from this course as any other. It is just as true that very poor results might follow its use. No course of study nor any text-book can compensate for a lack of art and scholarship on the part of a teacher. In this day and age when so much is said about evaluation of subject matter and concerning motivation and functional materials, it is exceedingly humorous to note that courses of study are still prepared on the very convenient plan of lumping off a certain number of pages of the text-book for each term or semester. The superintendent who submits this sort of *course* of study to his teachers, certainly will hardly have the assurance to criticise

them when they assign a lesson by saying "take page 87 tomorrow." A course of study should not bind the teacher unduly. It should always be subordinated to the good sense and judgment of the teacher. The teacher should use the course of study, should vitalize it, and not be enslaved by it.

THE VALUE OF A COURSE OF STUDY IN GEOGRAPHY

Any good course of study will evaluate the materials that are suggested for study. It does not follow, however, that all will agree on the values of the selected materials; but the author of every course of study, if such is worthy of consideration, will have in mind certain educational principles upon which his system is based, and to which his selected subject matter must be adjusted. In addition to this adjustment as a fundamental basis for considering values, there must be considerations of subject matter from the theoretical and practical points of view. The theoretical value of subject matter, as here used, relates to the reflex value or significance it contributes to other topics or subjects, thereby aiding in unifying and systematizing all into a rational body of knowledge. The practical value needs no comment except, perhaps, that practical worth means worth in life's activities and not that worth which is often made the basis of value, viz., the worth as viewed from a technical point of view, as the worth of geographical knowledge likely to assist in an examination for teacher's certificates, mail service, etc.

Briefly, a course of study in geography is of value as follows:

1. It should indicate the general trend of the subject and adjust the subject-matter to the particular system of which it is a part.

2. It should represent subject-matter units that have been duly evaluated with reference to a particular system.

3. It should reduce the vast number of topics of geography to the minimum, and it should arrange the topics in an order to show relative importance.

4. It should suggest the method of presentation, which method in geography should be problematical. (Illustration to follow.)

5. It should contain bibliographies of reference preferably with the exact pages and titles under which the subject-matter can be found. (This to save the time of the overworked *grade* teacher.)

There are two kinds of courses of study. One merely designates the amount of work to be done and usually indicates this amount by page reference to the text. The other is rather elaborate, suggesting a desired amount of work, giving hints as to method, citing references and presenting such a carefully evaluated list of topics or problems for study, as will give character, unity, and significance to the course when completed. A course of study of this kind is suggestive and helpful, while the first has little of value for the teacher. Indeed, the most useful course of study in geography

is the one that elaborates the related topics so fully that it really assumes the form of a manual. Professor R. E. Dodge prepared a course of this kind which appeared in the Teacher's College Record in March, 1901. Such a manual will assist the teacher in method of presentation, and by suggestion and reference, assist also in vitalizing the subject-matter.

THE COURSE OF STUDY SHOULD REFLECT THE METHOD OF PROCEDURE

The old empirical or dogmatic method in geography failed because it laid the whole burden upon the text. The pupil did little else than absorb. The new geography requires the pupil to read purposefully, to select data with definite ends in view, to draw inferences, to verify them by referring to authorities, and to apply principles, developed inductively, to new problems. Suppose, for example, our course of study suggests this problem in the study of New England: *What influence have the rivers of New England had on the development of manufactures?* The following suggestive exercise might follow:

1. Select five leading rivers by reference to your map. Trace their courses carefully.
2. Write the names of the selected rivers. How many of them drain lakes? Write the name of a lake drained by each river.
3. How do lakes affect the volume of water that rivers carry? Will such rivers "run dry" in summer? Can they be depended upon to furnish sufficient water to turn water-wheels at all times? Why? Write your explanation.
4. Remembering the topography of New England, would you expect waterfalls to be numerous? Explain why. Look through the descriptive matter in your text to verify your inferences.
5. What point in a stream affords the best water-power? Write a sentence to tell why. Look through your text carefully to ascertain if cities are located at waterfalls. Is mention made of Lowell, of Holyoke, of Lewiston, of Pawtucket? Why do you think Fall River was so named? Are these cities engaged in manufacturing? Record the leading manufactures of each.
6. Examine on the map the mouths of the larger New England rivers. Make a sketch map showing five rivers. Have these rivers wide mouths? Do you think ships can ascend these rivers for some distance?
7. Write a paragraph showing the influence of water-falls and navigable rivers on the development of manufacturing.
8. In the main, are the manufacturing cities in New England on the coast or inland? Why?
9. An ideal river for manufacturing purposes must possess three characteristics. Name them.

10. Examine your map and read text to determine if the leading rivers of New England possess these characteristics. Record your results.
11. The Merrimac River has borne the distinction of "turning more spindles than any other river in the world." Study your map carefully and write a short essay showing why the water-power of this stream should be so valuable. Name the important cities on this river and study your text to find out the leading manufactures.
12. How, then, have the rivers of New England influenced the development of manufactures?

A useful course of study should include occasional suggestions as to methods. Exercises like the above will direct the work in such a way that text-books will be used to definite, purposeful ends. Courses of study, therefore, must be directive in pointing out *how* as well as *what* to do.

COURSES OF STUDY CANNOT INDICATE THE EXACT AMOUNT OF WORK TO BE DONE

The needs and conditions in schools vary. If a course in geography is made for an individual school, then, perhaps, the exact amount of work—topic by topic—could be indicated, though such precision is not necessary or very desirable. Classes differ. The teacher must always consider the ability and needs of the pupils. A course for a county or state must make considerable allowance for varying conditions. More topics may appear in the course than any teacher may use. Local conditions must determine the selection and adaptation. A good course may *look* formidable, but remember it pre-supposes a *teacher*. Superintendents should teach their assistants how to use a course of study if they need such instruction.

Again, it may be stated that it is more difficult to prepare a course of study in geography than in arithmetic or even history. Geography lacks the coherence and sequence of arithmetic and the narrative of history. The number of topics treated in a course in geography, and to some extent, the order of treating them, may be of minor consideration. But the general trend of the proposed work, and the method of treatment are of prime importance.

THE GEOGRAPHY OF CURRENT EVENTS—THE BALKAN WAR

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IN too many schools, history is a matter of the past alone, while geography treats a period more or less recent according to the text used. Our study of geography in school should ally itself to the history of the past and the developments of the present day. One cannot study life in its environment profitably save as one considers how the physical surroundings of a nation

have helped to mould its activities and interests as time has passed, and notes present changes and tendencies in relation to their causes. History and geography should reach forward from textbooks into the daily and periodical press. The study of current events affords the best of geographical reviews. It recalls the old knowledge as it connects itself with questions of public concern. This aids in arousing and holding interest. It makes new connections of thought between facts as yet but weakly held in memory, serving thus to fix them for more ready recollection. It leads the teacher to test the pupils on many fields of fact and lines of thought, thus discovering the weak points in past teaching.

To teach current events, a teacher should have a sound grasp of general geography and history, and familiarity with the course of present day life. He must know the news of our times as set forth by journals and magazines of real worth. Instead of selecting the one topic he has well in mind, he may leave to the class the presentation of the news that most interests them. Whatever it is he will be ready to direct thought into profitable channels. If the teacher assigns the topic, it either means forced study by the pupils, or it favors a lecture by the teacher rather than discussion by the class.

The wise teacher will be alert to see the larger principles or general truths illustrated by current events, and will lead every discussion toward their restatement and appreciation. When the larger truth is discovered, other important illustrations of its influence may be instanced, and noted by a topical list, or by rough and rapid sketch maps. This broadens the scope of review work and makes clearer the principles involved.

The subject proposed, when I turned to one of my eighth grade classes this week, was the war in the Balkans. It was at once necessary to sketch a map of the region, showing the seas and countries and something of the relief. It was two years since the pupils had made a study of the region, and many had forgotten important place names and locations. As physical and political features were outlined, attention and interest were centered upon them, and a deeper impression made than when in previous study no fresh life-interest aroused the pupils. This phase of the study was followed up by the distribution of simple outline maps of the Nearer East printed on the school printing press from a zinc plate cut which reproduces a map of the region drawn to meet the need. The pupils duplicate the map free-hand, and write in the names of places. Later still as a test they write the names on a duplicate outline map—they cost us no more than the cheap paper on which they are printed.

As place names are recalled the facts of the present war are stated. This leads at once to an inquiry as to its causes, immediate and remote. It is evident that the Balkan region is the home of many racial, religious, and national groups. There meet Mohammedan and Christian powers. There are Greek, Slav, and Turk; Bulgarians, Roumanians, and Mace-

donians; Albanians, or Arnauts, Vlachs, Toskhs, Pomaks, and other smaller divisions.

The cause of such variety and contrast in life-types lies in the position and relief of the region, as the pupils may perceive. At Constantinople the land route from Asia to Europe crosses the water route which Genoa followed in her trade with the Farther East. The Balkans have been entered by invading races from either continent, passing along the highway of the nations. The sea has brought hither the Greeks and other seafaring and commercial folk from earliest ages. As to relief, European Turkey is a region broken into mountain blocks, now well worn, separated by lowland strips floored with waste. Invaders have displaced the dwellers in the fertile belts or plains; they have retreated to the mountain spurs and upper valleys, there to hold their own. Thus the Slavs of Montenegro have maintained their independence on the Black Mountain for centuries.

As a matter of history, pupils will recall that the efforts of Vasco da Gama, Columbus and their contemporaries to discover a sea route to India were due to the fall of Constantinople, long beset by the Mohammedan advance, and the consequent blocking of the established commercial routes. The Turks and their allies pressed on to the gates of Vienna. Since the time when they were finally checked they have been slowly pressed back. Our histories relate the exploits of Captain John Smith as an adventurer in the Christian armies attacking the Turks a century after the time of the Discovery of America. It is an opportune occasion to acquaint the children with the relief of Vienna by Sobieski, king of Poland, and the wresting of Hungary from Turkish control. *Famous Men of Modern Times* by Superintendents Haaren and Poland, published by the American Book Company, gives the account in good form.

The Balkan lands are rugged. Ridges and valleys in the main trend north and south. Communication is difficult. There are few railways. Remote from the centers of life in Western Europe feudal life and barbarous conditions have persisted in parts of European Turkey. In the western highlands (Albania) are the homes of war-loving mountain tribesmen, gathered in villages about the castles of their chiefs rather than in towns. It is natural that opposing faiths and racial rivalries should occasion conflicts and massacres in such a society. The Greeks, Bulgarians and Serbs, who with the support of the great Christian powers have gained independence, know of the oppression of their brothers still within the Turkish dominions. Although jealous of one another's ambitions to secure Balkan leadership and territorial extension, their antagonism toward the Turks has at last led them to make common cause against their ancient conquerors.

This tendency toward union in the Balkans illustrates a law of European and world life. When the physical barriers that divide tribes and races

into distrustful and warring peoples have been overcome through the development of means of communication and transportation, and through education and more intimate acquaintance, and when the enlargement of the outlook of a people has made them conscious of the interests which they have in common with their near neighbors, and of their need of confederation to resist the hostile action of more remote opponents, then a tendency to unite appears. If the same tendency that led to a united England and Great Britain, a united Germany and a united Italy, works out here there may come a federation of Balkan peoples.

As to the campaigns of the war, some note of the geographical control is worth while. Montenegro possessed the headwaters of Lake Scutari and part of its fertile plains. Its army naturally advances upon the Turkish stronghold of Scutari at the foot of the lake, which also commands the entrance to the valleys of northern Albania. The rivers of Servia rise across the border within Turkey; the Servians naturally moved promptly to take Pristina and other positions there, preparatory to moving over the low divide, thence along the valley railway route through the rich Vardar valley to the port of Saloniki. Bulgaria has possessed the broad base of the rich Maritza plains, Eastern Roumelia. Its army, of course, moved southward along the river's course upon Adrianople, the center of roadways and the fortified city of the lower valley in Turkey. The Grecian army moved northeastward past Mount Olympus toward the lower plains of the Vardar, in Macedonia. Successful advance would enable them to join the Servian troops in closing in on Turkish forces in the West.

The Balkan situation involves also the ambitions of the Great Powers of Europe. Why has the "Sick Man of Europe" maintained power there? The pupils doubtless know Russia's ambition to control a sea-way for her commerce and navy past Constantinople. They know that England is jealous of any such opportunity to threaten her communication along the Mediterranean route to India. They can perceive that Austria would prize possession of the valley-way from Novibazar, between Montenegro and Servia, along the Vardar lowlands to the excellent port of Saloniki on the Aegean Sea. They can see that Italy would regret the extension of Austrain power across the Adriatic, but would herself like to possess Albania. As to Germany, they know her commercial enterprise and unsatisfied colonial ambitions, and can appreciate that she would be inclined to support Turkey as a means of securing favors and advantages, for example, in Mesopotamia, where German interests plan to extend a railway which will eventually connect with lines to both India and Europe. The opposite aims of the Great Powers have suffered Turkish rule to persist; each has wanted the lion's share; they would not unite to force Turkey to keep her pledges for a real measure of self government in European Turkey, and they would let no one dispossess Turkey. This jealous rivalry has been the cause of

the fear that the racial and religious conflict in the Balkan region, which always threatens war, would involve all Europe in strife. At this writing it remains to be seen whether the victorious Balkan allies are sufficiently strong and united to hold the natural fruits of their victories against the wishes of the greater powers.

GLASGOW AND ITS HARBOR

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SUGGESTIONS AS TO THE METHOD OF TREATING THIS TOPIC IN CLASSES.

1. Glasgow is an example of unusual energy and foresight in river and harbor improvement. It has resulted in building up one of the great world centers for ship-building, manufacturing and commerce.

The causes which have produced this result in a region of such limited area are remarkable and are well worth our study.

2. The physical advantages and hindrances peculiar to each city and its larger relations to world-commerce should be examined and thoughtfully estimated.

3. Maps of the harbors can be found in the guide books (as in Baedeker), in the larger cyclopedias (as the Britannica), in reports like that of the Chicago Harbor Commission, and in steamship advertisements. These should be reproduced, in simple outline form, on the blackboard, by both teacher and pupils, as class discussion may require.

4. Pictures, illustrating docks, warehouses, ships, loading and unloading, cranes, bridges, locks, dry docks, dredges, harbor jetties, ocean steamships and harbor scenes can be collected from magazines, advertisements of ship companies, geographies and books of travel.

The city of Glasgow was, a hundred fifty years ago, an inland town some 18 miles from deep water in the Forth of Clyde. In spite of the fact that it was so far from the ocean, its people were energetic enough to carry on a large trade in tobacco with the American colonies, and later in cotton and other goods. In those days goods, brought by ship for Glasgow, were unloaded some eighteen or twenty miles from the city. They were either hauled in wagons or placed in small barges and poled up the Clyde River with the inflowing tide. But the water in the Clyde was so shallow that even with the inflowing tide, it was only three feet deep at Glasgow, and, with low tide, only about one or two feet in places. At Dumbuck Ford, twelve miles below Glasgow, one could wade the river easily at low tide. Such was the condition of the river till 1770. But at this time the growing

trade of Glasgow with America and with other countries led the merchants and the city council to form plans for deepening the channel of the river so that larger vessels could come up to the city docks to unload.

After various surveys and plans, the English Parliament authorized the City Council of Glasgow to enter upon a plan of river improvement. An engineer, Mr. Golborne, who had offered a simple scheme of deepening the river, was allowed to undertake the work. He proposed to narrow the channel of the river by building a jetty half way across the river at Dumbuck Ford, thus forcing the water to confine itself to a narrow passage. After building the jetty he began to dredge out this narrow channel, removing the heavy gravel so that the water could scour out a deeper passage. He was successful in this even beyond expectation. He had agreed to make a channel six feet deep and three hundred feet wide, and when the magistrates examined the passage they found it nearly seven feet deep, and a few years later in 1781, it was found that the river had scoured out a passage at this place fifteen feet deep at low water.

Following up this plan, jetties were built along the river, narrowing the channel; dredging machines were set to work digging out the gravel in shallow places, and raking up the dredged material along the banks between the jetties. In this way the current of the river was steadily deepened and narrowed, and the banks on either side were built up higher. By 1809 plans were formed to deepen the river to such an extent that there would be nine feet of water all the way to the docks at Glasgow, with an average neap tide.

The work of river improvement went on till 1825, when the dredging machines were set to digging to produce a channel thirteen feet deep from Glasgow to the sea. This was a sufficient depth for ocean-going vessels of that time. From that period on, Glasgow has been an ocean port for large vessels, and her commerce has grown and extended to all parts of the world. As larger vessels were built it was necessary still further to deepen the whole course of the Clyde to the docks. As this ocean commerce grew, it became necessary to widen the river again so as to allow the passage in and out of a greater number of vessels. (The first steamboat in Europe was built at Port Glasgow and was put on the river in 1812. Others were soon after built and from this period ship-building and ocean commerce have had a remarkable growth along the Clyde.)

By the year 1836, the channel of the Clyde to Glasgow had been deepened to fifteen feet at high tide. The work of improving and dredging went steadily forward to meet the need of larger and more numerous vessels entering the harbor, till in 1895 the channel was 28 feet deep. Even the lower part of the river below Port Glasgow had to be deepened, sandbanks removed and the material carried out to sea. From the year 1845 on, an account of the amount of material dredged out and carried

away has been kept. During fifty years up to 1895, 46,000,000 cubic yards of dredge material were removed from the river bed at a total cost of £1,725,000, or about $8,625,000.

One of the heaviest items of labor and expense in river improvement was the providing of docks and harbor room for the vessels wishing to load and unload goods at Glasgow. The river itself was narrow along the city, only about 145 feet wide, and there were, at first, no slips into which vessels could pass, but merely a landing place or quay built along the north bank. In 1800 this straight dock extended about a thousand feet along the bank. By 1831 this dock frontage had been extended about a mile along the river. But the river was now too narrow, and an expensive plan was carried out of widening it from 145 to 400 feet as it flowed through the city. The south bank had to be torn away and scooped out to the proper depth and a new shore line, with a long dock frontage was built on the south side of the river. By 1861, the extent of dockage along the river on both sides was about 2½ miles. But this deepening and widening of the river and building of shore docks were merely the beginning of a much larger harbor improvement. What was needed was a system of wet docks with entrances from the river and extending back into the land, where vessels could pass in and quietly load or unload, undisturbed by the busy life in the main channel of the river. Accordingly the first wet dock was built on the south side of the river in 1867. Five and a half acres, back from the river shore, were excavated to the proper depth, provided with docks along the sides and an entrance made from the river. It was known as the Kingston dock.

In 1872 work was begun on the Queen's Dock on the north shore. When completed in 1881 it had a water area of 33¾ acres. The containing wall was built around it, and the solid earth was scooped out to a water depth of twenty feet at low tide and removed. It is divided by a central quay 195 feet broad into three water basins and supplies, within its area, a dock frontage of more than two miles.

The Queen's Dock was hardly completed before additional harbor room was needed and the great Cessnock Dock on the opposite or south side of the river from Queen's Dock was begun. It is somewhat larger than the other, containing 34 2-3 acres of water area and more than two miles of quayage. With the completion of these extensive wet docks the whole harbor was supplied with about eight miles of wharf frontage.

Since 1875 a series of immense drydocks, for the repairing of vessels and cleaning the holds, has been constructed. The large ship-building firms have also constructed wet and dry docks along the river banks below Glasgow as a part of their ship building outfit.

In the building of these various wet and dry docks the city govern-

ment of Glasgow spent up to 1890 about ten million dollars. The purchase of land for the extension of the harbor and widening of the river cost the city about $7,500,000 more.

For the construction of other works in the harbor such as light-houses, buoys and beacons, and for cranes and hoisting apparatus for lifting and loading goods, and for other river improvements, $8,500,000 have been spent. Between the years 1770 and 1896 there was spent in the improvement of the river and harbor from Point Glasgow to Glasgow bridge, £15,810,000, or $79,000,000. It has been estimated by Mr. Albert Shaw that the total expense upon the river and harbor up to the year 1900 was about one hundred million dollars.

To meet this expense the city government has always levied a regular tax upon incoming vessels, and upon all merchants who enjoy the privileges of the harbor and docks.

The revenue of the Clyde Trust (That department of the city government which has had charge of the river and harbor improvement), as reported in the following table, is a good summary of the rapid and steady growth of the commerce of Glasgow. (Taken from Ball and Paten's *"Glasgow; Its Municipal Organization and Administration."*

The income for each period of ten years is as follows:

1771-80	$ 68,925
1781-90	96,925
1791-1800	155,565
1801-10	236,205
1811-20	300,095
1821-30	650,195
1831-40	1,640,890
1841-50	2,574,585
1851-60	4,043,865
1861-70	6,470,315
1871-80	9,846,600
1881-90	14,747,430

From 1890-95 the income was $8,080,475.

While the expense for these improvements has been great and increasing, the income from river and harbor tolls has increased more rapidly, the financial management has been entirely successful, and the river and harbor improvements have been of untold advantage to the city. The city also owns and manages a fleet of ferries and river steamers, for the transport of passengers and goods and thus secures a profit from this source.

The improvement of the Clyde navigation, which has been of such vast importance in building up the business and commerce of Glasgow, has been wholly managed by the City Council under laws passed by Parliament

in London. Private companies have had nothing to do with the control or management of these works.

The advantages which have come to Glasgow from deepening the river and digging out extensive harbors, with miles of well built wharves, have also built up a series of large towns and even cities along the river all the way to the sea. Patrick has 65,000 population, Govan 90,000, Renfrew 11,000; Clydebank 40,000, and there are several others of large size.

The population of the Glasgow district is now about one million. A hundred years ago its population was about 80,000. This remarkable growth is the more surprising because the land actually tributary to Glasgow reaches back only about twenty-five miles, a very small basis for a great city, in fact an area about as large as one of the Illinois counties.

The people of Glasgow have shown a very unusual energy in developing their small river and harbor. The expense was enormous, but they have made this little stream one of the most important navigable rivers in the world, and this little valley in the lowlands of Scotland has grown into an industrial centre as important as Pittsburg, with its twenty neighboring towns and suburbs.

EAST AND WEST, AND NORTH AND SOUTH TRAFFIC

By GEORGE D. HUBBARD,

Oberlin College, Oberlin, Ohio

FOR hundreds of years the chief commercial movements of the world's commodities have been east and west. Manufactures made in regions relatively thickly settled and less devoted to agriculture, have been sent to thinly populated territory, to people not engaged in manufacturing. And in return grain, stock, iron, and lumber have been sent from agricultural and mining districts to centers of manufacturing. Now that the population is becoming more uniformly distributed and manufacturing more general, while new lands for producing raw materials have vanished, there is less necessity for east and west trade.

The east and west intercourse was an adjustment to a temporary condition and not a response to a permanent difference between the resources or needs of the east and west. The future east and west traffic will correspond to geographic differences in the location of raw materials and manufacturing power, not to the economic division between the closely settled country and the free farm and grazing land. It becomes evident therefore, that east-west transportation will become *relatively* less important.

There is, however, a profound difference between the north and south, a difference more or less permanent which must soon call forth a much greater development of north and south trade. Tropical regions with their

warm climate, perennial summer, rich deep soils, dense and extensive forests and generally ample rainfall, must be great producers of eatables and other raw materials. Temperate zones will still produce but they must contain the factories, for they have the coal, the water power, iron, and skilled labor of the world. For climatic reasons they will long contain the larger part of the world's population and wealth. Therefore these more or less permanent differences will some day call out north and south trade on a large scale.

A further consideration in this problem grows out of the migration of the seasons from northern to southern hemisphere. While summer is on in the south temperate zone, winter dominates the north, and the reverse holds six months later. Already considerable trade is growing up between hemispheres because of these differences. Australian early apples and other summer fruits arrive in British Columbia and England in March, April, and May. There are great possibilities in this class of commerce. Cold storage on a boat for two or three weeks is much better than storage at home all winter. It is possible to ship grain, vegetables, and young stock as well as fruit from each temperate zone to the other as the seasons shift. Fast boats can bring Argentina's fruits to New York in ten days and carry ours to South Africa in about the same time.

With the development of north and south trade, ocean carriage will be stimulated, the Suez and Panama canals will find a larger field of usefulness; and agricultural interests in both temperate zones will be enlarged. But such an increase in meridional intercourse will not materially reduce the necessary transverse traffic, for the increase in population will maintain the necessity of the latter. Yet there will come an important change in the relative importance, bringing north and south commerce more and more into prominence.

PUPILS' VIEWS ON FIELD TRIPS IN GEOGRAPHY

EDITOR'S NOTE: Despite the wide-spread belief in the value of field studies, the minority of teachers of geography seem to have the necessary enthusiasm and self-confidence to take classes out for systematic field work. This is unfortunate. There are teachers, however, who are doing it and it does not take long for their reputation to spread. We asked one of these teachers, Miss Jane Hall of Ripon, Wisconsin, to have her pupils write on the subject, "My View of Field Trips in Geography," and permit this magazine to publish a few of the themes. Five of these follow:

We read many things in our Physical Geography that are hard to believe, but by going out on field trips we can prove them for ourselves.

Seward's Hill, one of the largest hills in Ripon, is an interesting place to study. It shows us the beds of soil and rock, and how they were formed.

If we studied this out of books, we could not get one-half as much as we can get by seeing it with our own eyes. Silver Creek, the stream that runs through Ripon, is also an interesting thing to study. Many things can be seen along the banks of this stream, such as, alluvial cones, flood plains, fossils, joint planes, islands, and soil deposits. If we had to study this out of a book, it would take at least three or four days, but by going out and studying the real things, it only takes an hour or two.

On going out on a trip right after a rain, one can see how the soil is eroded, and how clay, sand, and small stones are washed from place to place. With this in addition to the laboratory work on erosion, the subject is made very clear. At the same time if one looks about he will see little ponds of water in fields, and in others there are none. After looking carefully one can see the difference in soil, for a loamy soil absorbs the water more quickly than a clayey soil. To prove this in the laboratory would take much longer.

I think a field trip is a thing that should be had in every school, for one can have all the fresh air to breathe, and all the exercise he wants, which makes one feel ready to do an hour or two of good solid work. I think the field study is one of the most enjoyable of all studies and I think that all physical geography classes and other classes, who study nature should take field trips.

OSCAR A. WEINKE.

A field trip is a trip taken with the teacher and the rest of the pupils "cross country." They go where the subject they are studying is illustrated best. This is sometimes hills, valleys, quarries, streams, or different things studied in geography. These trips take either one or two periods, a period being forty minutes.

Things which you have studied in school, and found hard to believe, are made simple when you see them in nature. Things you have never understood well when studying in a schoolroom are easy to understand when seen by yourself. Old Mother Nature explains geography much better than any book can.

The children are taught to observe and appreciate nature. Long after their school days are over they will still find themselves noticing things that they saw in their geography trips.

Field trips are good for the pupils in still another way. They get the girls and boys into the fresh air.

As for keeping the pupils interested in their work, healthy and in good working order in every way, there is nothing like field trips.

MARGARET L. MAXWELL.

A field trip is an expedition which pupils take with their teacher to study natural geography; that is, to study the topics which their text books

give them, to see the natural illustrations, and to impress on their minds the things which are hard to understand from the text books, but are made clearer by actually seeing them.

The benefits derived from these trips are numerous. Some of them are: The out-of-door exercise and the clear fresh air, because we always try to take trips of this sort on a bright, sunshiny day. Other benefits are, they teach us to pay attention when the teacher is explaining something, to observe small things which may be of great value in future lessons, to observe the ways of Nature in her work of weathering and erosion, to be accurate, because on the next day a part of the class time is spent in writing a composition in which we describe the things we saw, things told by the teacher and our idea as to how certain soils were formed or how they got to those places; and lastly, to be polite and to obey the teacher.

These trips teach us that it is not necessary to take the words of the teacher or the authors of our text books when we have such excellent natural illustrations of our geography lessons within walking distance of the town. They also furnish new and interesting topics for common conversation. In one field trip we review and learn many new lessons in less time than it takes to get one lesson from the text book. Altogether, I think that field trips are much better for the pupil than studying and reciting in a warm and often a poorly ventilated classroom and laboratory.

ELDA HAMMERLING.

Our first field trip, a study on the work of rain, was taken the day after a shower. We followed a miniature valley and observed canyons, rapids, waterfalls, shoals, places of deposition and many other things. The forty minutes spent on this field trip gave more knowledge about the work of streams than several indoor study-periods.

Our second and third field trips included the study of rocks west of Ripon. We studied the formation of sandstone and limestone, outcrops, joint and bedding planes, oxidation, fossils, and several other things. This same study looked up in text and reference books would not be so deeply impressed and would take at least several times the time taken on these field trips.

The fourth field trip was the study of a large creek. We went along the banks of the stream and studied its course, depth, rapids, curves, falls, places of deposition and the formation of its valley.

A trip of this kind requires and teaches attention and accuracy, makes seemingly complicated subjects simple, requires self-control, besides giving one the advantages of fresh air and deep breathing. As an all around study and exercise period there is nothing in school life to equal it.

LEO Y. CONNEY.

One of the greatest educational values of a field trip is the power of observation which results from it. If we were only to observe things carefully, we should learn so much that we should never have to go to school at all. I mean if we should observe everything we read and see, we should be so smart that school could not do us any good. Then we learn accuracy, that is, not to exaggerate anything we saw; for we have to go home and prepare a theme describing what we saw. When we began to write up our first field trip we were surprised at the small amount we remembered. The next report was much better and much more accurate.

There is one other thing for which we take field trips; and that is to gain the art of applying our knowledge to everyday work or play. If we learn to apply one thing we can apply other things. We can learn a lesson by heart but unless we have something to apply it to, it has no real value to us.

KATHERINE TAINTON.

NOTES

ON MINERAL WASTE

"During the past year, in producing 500,000,000 tons of coal we wasted or left underground, in such condition that it probably will not be recovered in the future, 250,000,000 tons of coal; we turned loose into the atmosphere a quantity of natural gas larger than the total output of artificial gas during the same period in all the towns and cities of the United States; we wasted or lost in the mining, preparation, and treatment of other important metalliferous and non-metalliferous minerals from 10 to 50 per cent of the year's production of such minerals.

In a consideration of the possible activities of the individual, the State, and the Federal Government in behalf of a less wasteful use of our mineral resources certain facts and principles should be kept clearly in mind, namely:

That the present generation has the power, and it will exercise the right, to use as much of the country's resources as it actually needs; there can and there will be no such thing as stinting the present generation by bottling up resources for the use of the future.

That the Nation's needs are not likely to be curtailed; these needs will increase with extent and diversity of the Nation's industries, and they will increase more rapidly than population increases, for the reason that the per capita consumption of mineral products is rapidly increasing; and

That the men of this generation will not mine, extract, or use these

resources at continuous financial loss to themselves in order that something may be left for the use of future generations; there can be no such thing as a mineral industry without profits.

Furthermore, it should be clearly understood that the mineral resources of this country have required long ages for their accumulation and that of these resources the Nation has but one supply. There are no known substitutes available to meet the Nation's further needs when that supply will be exhausted and, to the best of our present knowledge, this one supply must serve as a basis for both the needs of the present and the far greater needs of the future.

In a higher way our mineral resources should be regarded as property to be used and to be held in trust with regard to both the present and future needs of the country. It should be remembered that neither human labor nor any human agency has contributed to their origin or to their intrinsic value, and that whatever rights the individual may possess have been derived from the General Government and from the State as the original owner. The State does not surrender its right, and should not neglect its duty, to safeguard the welfare of its future citizens by preventing the wasteful use of these resources. Though the individual may claim the right to use the resources in proportion to his needs and the needs of the community, he certainly has no right to waste that which is not needed for present use but is certain to be needed hereafter."

[J. A. Holmes in preface to Bulletin No. 47 of the Bureau of Mines.]

1910 CENSUS OF CHINA

The census which the Chinese government is taking has gone far enough to show that the total population of the Empire is "in round numbers, 325,000,000." The total Manchu population is approximately 1,500,000. "The present census gives Peking a total population of 805,110. In 1910 the children of school age in Peking numbered 47,653.—Although the new information furnished us by the census of 1910 is insufficient to base any conclusions on, it tends, at all events, to confirm the opinion I had reached in my earlier study of the question that the population of the Empire is much smaller than we have been led to believe, and that in the last century it has been increasing very slowly, if at all." [W. W. Rockhill, in September, 1912, *Bulletin American Geog. Society.*]

THE ESKIMO AND CIVILIZATION

The American Museum Journal for October, 1912, has an interesting article by Vilhjalmur Stefansson on "The Eskimo and Civilization." He states that it seems certain that the present Eskimo population of Arctic Alaska cannot be even ten per cent of the original number at the time of the Russian occupation. He estimates that in the Mackenzie river region

where in 1848 there was a population of near two thousand there are now but forty. "In the Mackenzie district, at least, the main cause of the decrease of population has been measles. There are on record, cases where out of a family of thirteen, eleven have died within a single week. Consumption was probably always present among the Mackenzie Eskimo, although its virulence has almost certainly been increased by the unnatural conditions under which the Eskimo have now been taught and forced to live. Other contagious diseases peculiar to Europeans have also had their effect." The author states that he saw no signs of these among the Coronation Gulf Eskimo who have not yet come in contact with the white man. "It is certain that not only are these diseases now absent, but that also they will soon be introduced and that the effect on the population of Coronation Gulf will be the same as it has been on the Mackenzie population.—A people such as the Eskimo, have, through the evolution of a thousand years, become delicately adjusted to the conditions of their environment. The coming of civilization, whether it be brought by whalers or by missionaries, will break that equilibrium and the result will be essentially the same.—No change of habits that the white men are likely to bring in will materially benefit the Eskimo, while three sets of new conditions in particular will work for his destruction—white men's houses, white men's food and white men's clothes."

EDITORIAL COMMENT

THE RESPONSIBILITY OF THE NORMAL SCHOOLS

At an annual convocation of superintendents of city schools held in Madison, Wisconsin, a year ago, nearly a full day was devoted to the discussion of geography teaching in the grade schools. One after another, superintendents of large experience declared that geography is the most poorly taught subject in their schools. From this there was scarcely a dissenting voice. A superintendent of one of the three largest American cities recently said the same of that city. Time after time this statement has been made to the writer by city superintendents in different parts of the country. So commonly is this view expressed at educational gatherings that one is forced to believe that it is very widely held.

What is the trouble? Why should geography be more poorly taught than other branches? Doubtless there is more than one reason, but the most important reason is the lack of adequate preparation on the part of teachers. Nor is this chiefly their own fault. It is the fault of the schools which send them out to teach without giving them adequate preparation in geography. Let us look at the situation precisely as it is. The Normal Schools are maintained by the states (and by some cities) for just one pri-

mary purpose. That purpose is the training of teachers for the public schools, chiefly the elementary schools. Upon the Normal and Training schools, the state places this responsibility. One of the four branches taught in substantially every fourth, fifth, sixth and seventh grade in every public school in the United States is geography. Principals of Normal schools know this. They know that nearly every teacher whom they graduate will probably be called upon to teach Geography, English, and Arithmetic. They also must know how unsatisfied the principals and superintendents are with the kind of geography teaching which they are getting from these graduates. The situation is perfectly clear and the responsibility is definite. The public has a right to ask that the fundamental branches be effectively taught in the elementary school. Geography is one of those branches and it is not, as a rule, being effectively taught, because the teachers are not adequately prepared. This is no fault of the teachers of geography in the Normal schools. They beg, almost on bended knee, that they be given a fair chance properly to fit the normal school students to teach geography. But they are seldom given that chance. Some graduates are sent out from the normal schools who have never had a day's instruction in geography in those schools; others have had a term or two in "professional review and method." Some have elected the optional courses in geography and have received a good training; for many Normal school teachers are abundantly able to train students for highly effective geography teaching if they only get the chance.

There is a splendid opportunity for some Normal school principal to make his school famous by issuing to the people of his state some such bulletin as this—

This Normal school is not reactionary and not out of sympathy with modern ideals of education but it stands first and foremost for the training of teachers who can teach effectively the fundamental branches of education, those so-called common branches which the experience of all ages and of all nations has settled upon as an indispensable foundation of an education.

The Normal school that will take this stand and carry it through will have such a call for its graduates that it can not begin to supply the demand.

Since nearly all Normal graduates will teach geography, and since there is now wide-spread dissatisfaction with the way in which it is taught, the responsibility for improving the condition rests chiefly with the administrative officers of the Normal schools. Nor is this written by one unfriendly to these schools. The writer is a Normal school graduate and was for eight years in the faculty of such a school. R. H. W.